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ABSTRACT

A study examined discussions on an instructional listserv, an open forum with several hundred subscribers across the world. The study investigated the coherence of a group of electronic mail (e-mail) messages taken from an academic listserv under one topic. Coherence is important as it contributes to the comprehension of a text. Participants on the listserv are mostly academic professionals and other professionals associated with the list's focus on instructional technology. First, e-mail messages on several topics were collected over a period of 1 month. Then, "No Jokes," the group of messages to be examined was selected; it contained 24 messages of different lengths. The subject e-mail message group was scrutinized for themes by using a qualitative content analysis procedure. Results indicated that out of the 24 messages there were 9 themes--one central theme was picked up in 14 messages; 20 times other themes were discussed across 16 messages; and 11 messages of 14 were sent within 2 days. Findings suggest that the e-mail message group seems to lack similarity in themes and the high dissimilarity level makes the group discussion less centered. Based on two measures of similarity and proximity, the messages seem to be lacking in coherence. Some implications for future research on e-mail in education are offered. (Contains 17 references.) (CR)

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Electronic Messages: Can We Expect Them to be Coherent?

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The phenomenal growth of personal computers and networks have made electronic mail communication a part of daily lives. It is regularly used by millions of users around the world. Noticing the potential benefits e-mail communication will bring into schools and colleges, educators and educational researchers have been making efforts to bring e-mail into educational settings (e.g., D'Souza, 1991; Fey, 1994; Hawisher & Moran, 1993). E-mail has been used as a tentative tool in teaching writing, as a way to broadening students' perspectives by connecting them with people beyond their classrooms, as a means to facilitate collaboration, and a way to understand pre-service teachers' reflexive processes. Given the wide-spread use of e-mail communication in education, quality research of e-mail and its effects on education is much needed yet still to come (see Herring, 1996a; Tao, 1995), particularly on the textual nature of e-mail messages.

Textual nature of e-mail refers to the fact that e-mail messages are composed of words to the exclusion of graphics. It has been listed as one of the characteristics of e-mail communication (Garton & Wellman, 1995). However, researchers in education have focused more on the social aspects of e-mail in educational settings than on its prominent textual feature, which is mentioned, if at all, in a more or less an after-thought manner. For example, Hawisher and Moran (1993) remarked from their own observations that e-mail messages are fragmentary, lacking coherence, and distractive. Romiszowski and de Haas (1989) made similar observations concerning students' use of e-mail. Wilkins (1991) examined students' language use on e-mail communication using social-linguistic perspective. Some informal language features were identified. Yates and Orlikowski (1992) suggested that e-mail messages should be studied from a genre perspective by classifying them according to their different characteristics such as memo, letters, etc.

Recently there have been some initial attempts at a systematic study of e-mail's textual features (Collot & Belmore, 1996; Herring, 1996b; Yates, 1996). Collot and Belmore (1996) examined the electronic language in a large corpus of electronic messages against an established written language and spoken language model along six dimensions. Yates (1996) used Hallidayan model in examining another large corpus of electronic messages. Both of these studies

found a lot of variations of electronic language along the written and spoken continuum. Herring (1996) used electronic messages from two mailing lists to look for any basic e-mail message structures and gender differences as reflected through variants of the basic structures. Yet up to now, e-mail studies have not closely examined one of the most important textual features of communication: coherence. Herring's study (1996) did touch on the concept of coherence. However, her focus was more on discovering the basic e-mail message structures as a whole than on coherence. The present study investigates the coherence of a group of e-mail messages taken from an academic listserv under one topic.

Coherence is important as it contributes to the comprehension of a text. Different communication models may demonstrate certain different techniques in realizing coherence. For example, traditional written texts cannot depend upon immediate feedback, facial expressions for comprehending discourse as oral conversations can. Therefore, knowledge of the coherent degree of texts using electronic communication modality would be essential in carrying out successful communication via e-mail.

A word of clarification regarding the term coherence and cohesion is in order here. Coherence and cohesion are sometimes used loosely in describing the connectedness of a discourse. In fact, definitions about these two terms are by no means agreed upon by linguists (Stoddard, 1991). Here we are adopting Campbell's discussion (1995) concerning the nature of coherence and cohesion because it is clear and practical. Cohesion refers to the physical textual features that connect a discourse, while coherence includes a consideration of the situations in which the discourse occurs. Simply put, in Campbell's classification, cohesion is co-textual and coherence is con-textual. We may further distinguish these terms by stating that if cohesion refers to the linguistic elements within a discourse, coherence points to the mental representation these elements create in a reader or receiver. That perhaps is the reason that reading researchers are more interested in coherence than in cohesion (e.g., Kintsch & van Dijk, 1978).

Conventional discourse analyses via cohesion and coherence have been performed with some success (Halliday & Hasan, 1976; Kintsch & van Dijk, 1978). For example, the typology of cohesive types identified by Halliday and Hasan (1976) have been constantly applied to text analysis (see Campbell, 1995). Kintsch and van Dijk's macro and micro structures depend upon propositions in a text for coherence and have been used extensively in text research. However, as some researchers (e.g., Campbell, 1995; Stoddard, 1991) have pointed out,

limitations of Halliday and Hasan's cohesion theory and other theories of the similar nature are obvious. They have limited applicability to naturally occurring text. For instance, Campbell (1995) has observed that Halliday and Hasan's extensive cohesive ties in discourse analysis is only applicable in analyzing a short text and would be severely restricted in application to any longer text. Likewise, the propositional approach of Kintsch and van Dijk (1978) is only practical when the text is short.

Based on his understanding of the limitations of Halliday and Hasan's (1976) original schema in cohesion of discourse, Campbell (1995) has suggested a Gestalt approach to understand and analyze continuity in a discourse. Two of the most salient and interesting elements he points out in discourse analysis are based upon Gestalt's perception of continuity: similarity and proximity. According to him, similarity refers to the semantic, syntactic, and even visual parallels within a discourse; proximity refers to the spatial perceptions of the similarity elements within a discourse. It is mainly the function of these two principles that establishes the discourse continuity and the perception of continuity on the part of a reader. The present study adopts Campbell's perception of continuity with appropriate modifications in discussing coherence issue in e-mail messages.

Before we proceed, it is necessary to look at the physical and conceptual similarities and differences between conventional discourse forms and e-mail messages taken from a listserv discussion group on a topic.

There are two conventional discourse forms: written and spoken. Compared and contrasted with written discourses, e-mail messages have the following similarities and differences. First of all, they are both written, and therefore share the same visual symbols (here they are the 26 English letters), which are presented on a surface, whether the surface be a piece of paper or a computer screen. Second, the grouping of these symbols involves the same grammatical rules (such as punctuation, capitalization, etc.) which govern written discourses. Third, like conventional written discourses, e-mail messages can be reread and preserved for future reference or use. This latter feature helps the text overcome the barrier of time and space.

The differences of e-mail messages with the conventional written discourse stem from the interactive or semi-interactive nature of e-mail. E-mail messages are usually written with a clearer audience in "sight": the participants in the discussion group. Participants can always "drop in" for the discussion.

Due to this nature, e-mail messages usually represent multiple voices, and consequently multiple styles, rather than a single one as in conventional discourse forms, say, a paper. People join in e-mail discussions from different places and at their own convenience. Also due to the participation pattern resulting from this nature, e-mail messages are usually written in a more casual way than a formal written text. Less attention is allocated to spellings in e-mail situation than in conventional writings.

A closer look at the differences between e-mail messages and written discourses reveals that these differences move e-mail messages more toward conversation or spoken discourse. When multiple voices are represented in a group of e-mail messages, they are similar to a conversation carried on by multiple interlocutors. The casual styles of e-mail messages also resemble those of conversation. However, e-mail messages have characteristics which make them differ from conversations. First, they are not as interactive as a face-to-face or phone conversation. Most of the e-mail messages in a discussion group are sent only at the sender's convenience. In other words, e-mail discussion usually does not happen with all participants engaged in discussion at the same time. Second, unlike a conversation, e-mail messages are not as evanescent as usual conversation and can be kept beyond the time when they were produced.

A chart is provided here to visually summarize the differences and similarities between e-mail on one hand and a written/spoken discourse on the other.

Insert Table One About Here

The chart compares characteristics of the three discourse types in 11 aspects. These 11 aspects range from visual features to author/reader participation, and to auditory characteristics. The Visual aspect refers to the fact that information presented is to be seen in discourse forms of writing and e-mail. Likewise, such features as Tone and Sound refer to the auditory way spoken discourse is conveyed. Timeless feature points to the fact that discourse form does not disappear with the passing of time. For example, a written message can be preserved over time, while a dialogue usually fades when time passes. Interactive feature is about the engaging form of the discourse in question. For example, interaction is not part of the in-built mechanism of a book. However, e-mail discussion and dialogue certainly cannot be successfully carried on without

the interactions among participants. These 11 aspects of differences and similarities as summarized in the chart also help to set a framework for the following discussion.

Considering the nature of their text-based representations, e-mail messages should be able to subject to discourse analysis using traditional methods in regard to the message coherence. However, the textual nature of e-mail messages is such that multiple styles have been represented in a lengthy body of texts. Traditional discourse analysis methods of either cohesive types or the propositional approach are not able to come up with an appropriate analysis of this special "discourse" form. As was stated before, the traditional discourse analysis methods are limited in their application to any lengthy text. Different styles of e-mail discussion group messages further complicate the matter of analysis by traditional means.

But with the concepts of similarity and proximity introduced by Campbell (1995), it is possible to analyze for coherence the e-mail messages from a discussion group without being bogged down by too many details. Because e-mail messages from a discussion group, though with multiple styles, are all concerned with a similar topic, we can recognize common recurring themes using the similarity principle. The proximity principle is another useful measurement for multiple messages, which might be on a similar theme but composed at a different time and with other messages set in between them.

The present study intended to investigate coherence in e-mail messages by employing Campbell's (1995) similarity and proximity principles. Specifically, the research questions guiding this study were:

1) Were e-mail messages from a discussion group under a similar topic coherent?

2) How were the e-mail messages measured in terms of coherence using similarity and proximity principles?

Method and Procedures

Discussions on an instructional technology listserv were monitored for one month. The instructional technology listserv is an open forum with several hundred subscribers across the world. Participants are mostly academic professionals and other professionals associated with the list's focus on instructional technology.

E-mail discussion messages on several topics were collected over a period of one month. Though the focus of this study was on one topic, the others were

collected for the sake of making meaningful comparisons in terms of the length and duration of the discussions on these topics. The discussions around a topic were defined as all the messages that bear the same title or slightly altered title in the title line of the e-mail messages. The assumption for this definition was as follows: 1) There needed to be a cut-off line for the data collection that was meaningful and within the researcher's resource; 2) A topic usually provided a way for an e-mail user to select messages for focused reading and responding.

The group of e-mail messages examined was under the title "No Jokes" and contained 24 messages of different lengths. The number of messages contained was comparable to messages usually contained in a discussion around a topic. The other two groups collected at the same time contained 28 and 30 messages of different lengths. The message length in the targeted group ranged from 11 word to 887 word per message. This range of word per message is also typical of the other discussion messages monitored.

The concerned body of e-mail messages was scrutinized for themes by employing a qualitative content analysis procedure. A simple count of frequency of the themes was used after the themes were identified.

Repeated readings of these messages were done to identify possible themes contained. In this study, the data were not exhausted to the point of saturation as the grounded analysis (Strauss & Corbin, 1990) would dictate. However, cautions were taken in examining the themes. The repeated readings were done over a period of 4 weeks to ensure the consistency by the same researcher. A definition for the themes was established. A theme was defined as the idea that was distinctly the central subject of a discourse or discussion. The following example illustrated the central theme of "lack of humor in instructional design":

> One of the problems I've always had with Instructional Design is its total lack of humour. It's not simply because ID textbooks don't contain any jokes (in fact no text seems to be complete without a cliched reprint from Peanuts of Carvin & Hobbes), but it's because all the instructional designers I know totally neglect the value of humour as a teaching tool. I once went to an instructional design conference and the best joke was an OHP of a recursive loop.

Sometimes a discourse may have more than one theme. Usually a new theme was realized through another message focusing on some subordinate idea a previous message had. For example, the above paragraph was quoted in

message number six but was given a new twist for a different theme, "Complaint about high cost of reprint":

> That's a great idea, who wants to pay for the rights to use the cartoon? Anything that is reprinted in a book usually is done so at a hefty price. For example, we wanted to reprint a sample word problem from a math book (about 1/2 page in length) and the publisher wanted $500+. We ended up creating our own example problem to illustrate the concept. Other publishers are more reasonable (like $50 to reproduce a well known algorithm).

When all the possible themes were identified, the similarity principle was used to measure the occurrences of different themes. Likewise, the proximity principle was then applied to the identified themes to gauge the temporal and spatial (inter-message) distance of the same and different themes.

Results

A graphic presentation of the results was provided in Table Two.

Insert Table Two Here

Similarity. Out of 24 messages, there were total 9 themes. There was one central theme which was picked up in 14 messages. Out of these 14 messages, 4 of them were only marginally germane to the theme in discussion. In other words, they did not follow up on the theme but mentioned it only to digress into their own anecdotal experiences which had little to do with the central theme. Seven of these 14 cited various portions of the targeted messages to allow readers to connect with the messages to which they were responding.

Four of the 9 themes were in 3 messages. Others were seldom touched but once or twice.

Occasionally, jargon and events mentioned in previous discussions of different topics appeared in the messages under this topic.

Proximity. The flow of the central theme across the 14 messages that discussed it was interspersed with other themes. There were 20 times when these other themes were discussed across 16 messages. Two other messages were wrongly sent personal messages, completely irrelevant to the 9 themes.

The messages were sent during a period of 10 days. However, the main body of the message group concentrated on a two-day period. Nineteen messages were sent within these two days. There were some days when no

related messages were sent. Eleven messages out of 14 grouping around a theme were sent within these two days. People from virtually all over the world were participating in the discussions. They were from the United States, the United Kingdom, South Africa, Hong Kong, and Japan. Twelve people contributed to these 14 messages.

Discussion and Conclusions

In the present study, themes are used as the indicator for similarity and space and temporal distance as the indicator for proximity. As this is an initial attempt to study the e-mail's textual feature of coherence, there might be some methodological concerns. For example, can the theme be used as the indicator for establishing coherence without losing sight of the details that might be better represented by cohesive ties? In the current study the dynamic nature of e-mail communication may have been overlooked to some extent. Besides, e-mail discussion groups are different from individual e-mail communications. Therefore, no conclusions can be directly drawn from the present study concerning one-to-one e-mail communications.

The analysis indicates that similarity level of the present e-mail message group under one common topic is quite low on the whole. Fourteen out of 24 messages are about the central theme that is in the title line of this group of e-mail messages. This is close to what Herring (1996b) discovered about notional coherence. The dissimilarity due to the variety of themes is fairly high. This dissimilarity is detected in two aspects. First, nine themes are embedded in 24 messages. Second, there are 20 times when the 8 themes other than the central one are discussed or mentioned in the 24 messages. The high frequency of the occurrence of dissimilarity makes the message group multiply focused rather than centrally focused. If we factor in the occasional jargons and mentioning of events discussed in some previous message groups, the dissimilarity level further increases. Besides, not all participants seemed to take advantage of the easy quotations of any previous message in e-mail situation, which seems to have exacerbated the dissimilarity level. Only 12 out of 24 messages contain quotations from previous messages. Given the easy message quoting functions of e-mail, this is an interesting phenomenon.

Most of the messages of the central themes examined are sent within a period of two days. According to the proximity principle, this seems to create a sense of being in the same group on the part of the participants. The fact that many senders are from such different countries as Japan, South Africa, Hong

Kong, England, and the United States should not have affected the space distance between messages. For e-mail communication is usually sent and received within a matter of minutes despite the physical distance between the sender and the receiver. But when the discussions of the central theme or the topic are interspersed about 20 times with the other 8 themes, the inter-message proximity level might have suffered.

The following conclusions are offered based on the analysis:

The e-mail message group examined seems to lack similarity in themes. The high dissimilarity level makes the group discussion less centered as the topic indicates. In other words, the present e-mail messages around a same topic are about many different themes and appear to be fragmented in nature. This may be an evidence of less coherence of listserv e-mail messages. This coincides with the intuitive feelings some researchers have in regard to e-mail communication (see Hawisher & Moran, 1993).

Due to the differences in styles, lengths, and vast contributors to the themed discussion, the proximity they have in temporal dimension (all sent within two days) might be watered down. In other words, dissimilarity might overshadow proximity of time. This, if confirmed, might mean less coherence when being read by readers. Besides, the inter-message proximity is also low with the other 8 themes interspersed across 24 messages 20 times.

Based on the two measures of similarity and proximity, this group of e-mail messages seems to be lacking in coherence. The dissimilarity created by multiple themes in this group of e-mail messages seems to have significantly contributed to this lack of coherence.

While the 24 messages ranged from straight-face scholarly citation of literature to witty jokes, they look more like a mosaic than a solid whole. Consequently, the themes are seldom developed in any depth. This appears to resemble a conversation in which every party talks to generate more interaction than content depth. This finding is consistent with Romiszowski & de Haas's (1989) reflection on their experience with e-mail in their class.

Some implications for future research on e-mail in education are offered here:

First, the nature of the e-mail discussion groups can be further explored by using more detailed textual analyses in addition to the similarity and proximity measures used in this study. Computer programs that can help parse

the data can be invested into for future research to deal with large e-mail database.

Second, the present study suggests that this less coherent feature of e-mail discussion groups deserves our special attention, especially when we want to involve our children in e-mail discussions. The cognitive characteristics of children at different stages of psychology development should be fully considered before e-mail communication can be used effectively in educational settings. For example, children in elementary schools may need more guidance and direction in using e-mail discussions than children at the middle grades.

Last but not least, readers' actual response to the lack of coherence should be investigated in future studies in order to understand better the nature of e-mail discussion groups and e-mail communication. For example, studies concerning the reading strategies of students in reading e-mail discussion groups can provide useful information about the coherence nature of e-mail discussion groups.

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Table One

Features of Three Discourse Types

	Written discourse	E-mail Message Group	Spoken Discourse (Dialog)
Visual Presentation	YES	YES	
Use of Punctuations	YES	YES	
Timelessness	YES	YES	
Single Author	YES	yes*	
Smileys		YES	
Multiple Participants		YES	YES
Interactiveness		yes*	YES
Synchronity		yes*	YES
Use of Tone			YES
Use of Other Nonverbal Expressions			YES
Use of Sound			YES

*low case "yes" indicates that the feature is somewhat/sometime in there, but not a distinct feature capitalized "YES" is.

Table Two
Tabulation of messages within the topic group

No. of Messa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Place of sender	HK	US	JP	SE	ZA	US	UK	US	US	US	US	UK	HK	UK	US	US	US	US	US	US	US	US	US	US
Day sent	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	5	5	10
Sender	1	2	3	4	5	6	7	8	9	10	6	7	1	11	12	13	10	9	14	15	15	16	14	17
Theme One	Y					(y)																		
Theme Two	Y			Y			Y	Y	(y)	Y		Y		(y)	Y	(y)		Y	Y			Y		(y)
Theme Three	Y		Y																					
Theme Four	Y													Y					Y					
Theme Five			Y	Y	Y																			
Theme Six						Y																		
Theme Seven									Y															
Theme Eight											Y					Y								Y
Theme Nine												Y	Y				Y							
AG		AG																			N	N	Y	
Quote Messa		W (1)				P (1)	P (1)	P (4)	W (1)	P (7)		P (10)	W (12)		P (12)		P (12)	P (12)					W (22)	

Note. Y=theme being picked up.
(y)=theme being marginally touched.
AG=Simple agreement without any further comments or elaboration.
N=Totally irrelevant personal message wrongly sent to the whole group.
W=whole message quoted.
P=portion(s) of a message quoted.